

National Aeronautics and  
Space Administration



# Guiding Innovation Through Test & Analysis

## NASA JSC Approach

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# Proof of Concept Through Design



- Benefits of early testing and analysis:
  - Testing materials, components, systems early in the process can validate a concept and possibly shorten the design cycle.
    - Braided Kevlar for wheel spokes
    - Copper coated aluminum wire
    - New type of fuses
  - Improve probability of success
  - Improve reliability and life of product
  - Improve safety



# Qualification of Product



- Quality of materials, components, parts, etc. is critical for qualification units to reduce number of variables during test/analysis:
  - Design flaws
    - Environmental conditions exceed expectations
    - Loads higher than predicted
  - Manufacturing or construction flaws

Versus failure of a component which could prove impossible to isolate.

# Qualification to Production



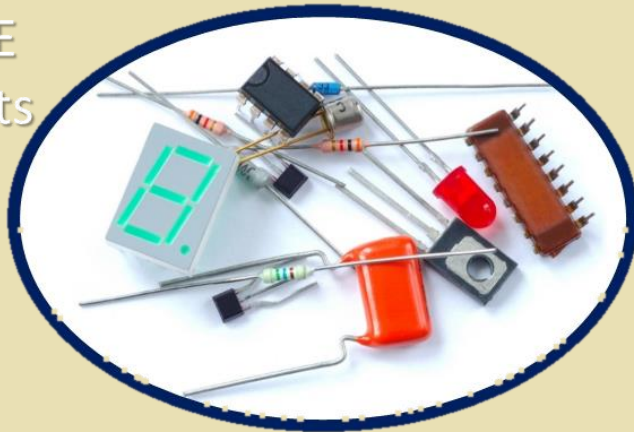
- **Prevention**
  - Efforts to assure good parts/products are procured from reputable vendors
  - Most important aspect of product quality
- **Detection**
  - Efforts to verify authenticity of parts/products
  - Additional investigation (usually destructive) can be performed if discrepant characteristics are noted
- **Knowledge**
  - Efforts to share information on non-conforming product
  - Efforts to train employees on how to identify discrepant characteristics and/or suspicious attributes indicative of counterfeiting



# Product lines tested and inspected



EEE  
Parts



Fasteners & Mechanical Parts



Gases



Raw Materials





# Concerns with today's supply chain

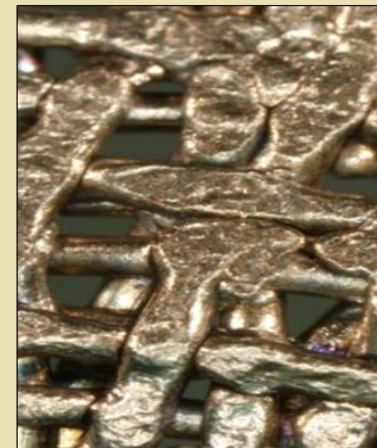


- Industry-wide, global problem. "Since 1982, the global trade in illegitimate goods has increased from \$5.5 billion to approximately \$600 billion annually. Approximately 5%-7% of the world trade is in counterfeit goods." Source: International Anti-Counterfeiting Coalition (IACC)
- "Counterfeiting and piracy cost the U.S. economy between \$200-\$250 billion per year, and has contributed to the loss of approximately 750,000 American jobs." Source: FBI estimates.
- Current value of counterfeit components is between \$1 and \$10 billion annually. Most counterfeit cases are not documented – volume too large.
- "U.S. companies suffer \$9 billion in trade losses due to international copyright piracy. Counterfeiting poses a threat to global health and safety. Counterfeiting poses a threat to global health and safety." Source: IACC
- ERAI, Inc. receives ~200 suspect counterfeit part complaints/month and confirmed more than 2800 brokers selling counterfeit components.
  - Source: SAE International

# Product Lines – Fasteners & Mechanical Parts



- NASA Receiving Inspection and Test Facility (RITF) tests lots of fasteners for NASA, contractors, and other corporations
- 2014 – 329 Fastener Jobs
  - 7 rejections – Failed fastener Tensile
  - 2 rejections – Failed fastener Hardness
  - 5 rejections – Failed fastener OES (Chemistry)
- 2015 - 164 Fastener Jobs (YTD)
  - 2 rejections – Failed fastener Tensile
  - 2 rejections – Failed fastener OES (Chemistry)







# RITF Capabilities – Electrical and Mechanical



***The RITF's screening services subject hardware, parts, components, and raw materials to a rigorous regimen of testing to identify and avoid use of substandard parts and materials as well as counterfeits.***

- Electronic component screening
  - A regimen of testing is used to ensure that parts and components meet the respective specifications for which they were procured.
- Counterfeit parts identification
  - An expanded regimen of testing and non-destructive evaluation is required to disposition suspect parts that are flagged as being potentially counterfeit.
- Fastener acceptance screening
  - A regimen of testing is used to screen fasteners to ensure they perform according to the specifications for which they were procured.
- FOD and loose particle screening
  - A screening method to identify devices with loose particles that could become dislodged and short out the device.
- Raw material validation (metallics)
  - A screening regimen used to validate that metallic materials meet requirements of their procurement specifications.
- Wire and cable acceptance screening
  - A regimen of testing is used to screen wire and its insulation to assess performance in extreme environments.





# How to Utilize the RITF



The RITF testing and analysis capabilities are available to commercial companies and other government agencies through a third party intermediary – BayTech and through independent Space Act Agreements (SAA)

- BayTech holds an existing (SAA) with NASA
  - Agreements can be established in a few days
  - Turnaround times for testing and analysis minimized
- Commercial companies can establish their own SAA with NASA for partnerships allowing the use of the RITF
- Existing agreements providing screening and failure analysis for:
  - Oil and Gas Industry
  - Government Regulatory Agency
  - Chemical Industry
  - Electronics Industry

To schedule a tour of the RITF or to discuss needs and possible partnering opportunities, please contact the following:

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